REMARKS

This application has been carefully reviewed in light of the Office Action dated November 14, 2007. Claims 1 and 3 to 18 are pending in the application, with Claims 2, 19 and 20 having been cancelled herein. Claims 1, 13 and 14 are the independent claims. Reconsideration and further examination are respectfully requested.

Claims 1, 3 to 7 and 9 to 20 were rejected under 35 U.S.C. § 102(b) over U.S. Patent Publication No. 2002/0181765 (Mori), Claim 2 was rejected under 35 U.S.C. § 103(a) over Mori in view of U.S. Patent Publication No. 2002/0181775 (Matsugu), and Claim 8 was rejected under 35 U.S.C. § 103(a) over Mori in view of U.S. Patent No. 5,570,434 (Badique). Reconsideration and withdrawal of these rejections are respectfully requested.

The present invention is generally directed to pattern identification, and more particularly is directed to identifying a pattern of input data by hierarchically extracting features of the input data. A feature of a first layer is extracted and a distribution of a feature extraction result of the first layer is analyzed. According to one aspect of the invention, likelihoods of a plurality of categories for features of a second layer higher than the first layer is calculated on the basis of the analyzed distribution of the first layer. A category whose calculated likelihood is not less than a predetermined value is determined and a feature belonging to the determined category is extracted from the second layer.

By virtue of this arrangement, it is ordinarily possible to refine a feature extracted from input data and to perform a pattern identification at a high speed with high accuracy.

Turning to specific claim language, amended independent Claim 1 is directed to a pattern identification method of identifying a pattern of input data by hierarchically extracting features of the input data. The method includes a first feature extraction step of extracting a feature of a first layer and an analysis step of analyzing a distribution of a feature extraction result in the first feature extraction step. The method further includes a calculation step of calculating likelihoods of a plurality of categories for features of a second layer higher than the first layer on the basis of the distribution analyzed in the analysis step. The method also includes a determination step of determining a category, from among the plurality of categories, whose calculated likelihood is not less than a predetermined value and a second feature extraction step of extracting a feature which belongs to the determined category from the second layer.

Amended independent Claims 13 and 14 are directed towards apparatus and computer medium claims, respectively, substantially in accordance with the method of Claim 1.

The applied art, alone or in any permissible combination, is not seen to disclose or to suggest the features of independent Claims 1, 13 and 14, and in particular, is not seen to disclose or to suggest at least the features of calculating likelihoods of a plurality of categories for features of a second layer higher than a first layer on a basis of an analyzed distribution of a feature extraction of the first layer, determining a category, from among the plurality of categories, whose calculated likelihood is not less than a predetermined value, and extracting a feature which belongs to the determined category from the second layer.

In this regard, Mori is seen to disclose a pattern recognition apparatus for detecting a predetermined pattern contained in an input signal. The apparatus is provided with plural detecting processing parts for detecting respectively different features for a same input and plural integrating processing parts for spatially integrating the features detected by the plural detecting processing parts. (See Mori, Abstract and paragraphs [0056] and [0057]). Moreover, Mori is seen to disclose extracting features of the input data in layers, and that a feature extraction for a next layer is carried out based on an integrating result obtained by executing integration of feature detection outputs from a present layer. (See Mori, paragraphs [0053] and [0054]). However, Mori is not seen to disclose identifying a pattern of input data by calculating likelihoods of a plurality of categories for features of a second layer higher than a first layer on a basis of an analyzed distribution of a feature extraction of the first layer, determining a category, from among the plurality of categories, whose calculated likelihood is not less than a predetermined value, and extracting a feature which belongs to the determined category from the second layer.

Matsugu is seen to disclose a pattern recognition apparatus having a local area recognition module, a local area scanning unit, and a consolidation module. (See Matsugu, Abstract). Pattern data is acquired using the local area scanning unit in which a feature detection layer performs detection of a low-order local feature of an image pattern received from a data input layer, for a plurality of scale levels or a plurality of feature categories in a local area centered at each scanning point. (See Matsugu, paragraph [0047]). The consolidation module includes a high-order pattern map generation unit for generating a map of detection levels of high-order patterns and positions thereof, and a middle-order pattern consolidation unit for outputting a predicted position of a middle-

order pattern that will be predicted, and also outputting a high-order pattern having a highest matching degree with regards to the position of the middle-order pattern. (See Matsugu, paragraph [0062]). In a case where no high-order pattern is detected and only a middle-order pattern element is detected, the consolidation module selects one candidate for a high-order pattern and predicts a category and a position of other middle-order pattern that will be detected in the candidate. (See Matsugu, paragraph [0066]). The middle-order pattern consolidation unit then outputs a signal which has a level depending on whether the pattern of the predicted category of middle-order pattern will be detected at the predicted position and which thus indicates a detection probability that a pattern of the predicted category will be detected. (See Matsugu, paragraph [0067] and [0082]). On the other hand, in a case where a high-order pattern with an output level higher than a predetermined threshold value is detected, the local area recognition module outputs detection likelihood and position information of an object detected in that local area to the consolidation module. (See Matsugu, paragraph [0068]).

Thus, Matsugu is only seen to disclose calculating a detection likelihood of a high-order pattern from a middle-order pattern, based on detection results from all the middle-order pattern categories for a candidate high-order pattern selected by the consolidation module. However, Matsugu is not seen to disclose identifying a pattern of input data by calculating likelihoods of a plurality of categories for features of a second layer higher than a first layer on a basis of an analyzed distribution of a feature extraction of the first layer, determining a category, from among the plurality of categories, whose calculated likelihood is not less than a predetermined value, and extracting a feature which belongs to the determined category from the second layer.

The remaining applied reference, namely Badique, is not seen to cure the deficiencies of Mori and/or Matsugu. In this regard, Badique is merely seen to disclose that face recognition is performed by checking a position of an eye or mouth using centers of gravity located in a face area. However, Badique is not seen to add anything that, when combined with Mori and/or Matsugu would have resulted in at least the features of calculating likelihoods of a plurality of categories for features of a second layer higher than a first layer on a basis of an analyzed distribution of a feature extraction of the first layer, determining a category, from among the plurality of categories, whose calculated likelihood is not less than a predetermined value, and extracting a feature which belongs to the determined category from the second layer.

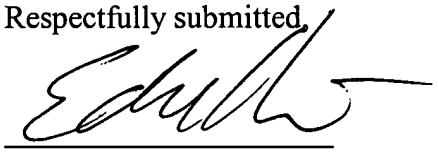
In view of the foregoing amendments and remarks, amended independent Claims 1, 13 and 14, as well as the claims dependent therefrom, are believed to be allowable.

No other matters having been raised, the entire application is believed to be in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience.

As a formal matter, Applicants request that the Examiner provide an indication in the next communication acknowledging Applicants' claim to priority under 35 U.S.C. § 119 and receipt of the certified copy of the priority document.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,



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